

August 30, 2016

Meagan E. Ormand  
Golder Associates Inc.  
2108 W. Laburnum Ave.  
Suite 200  
Richmond, VA 23227

RE: Project: Bremo Monthly Process  
Pace Project No.: 92310435

Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on August 29, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Nicole Gasiorowski  
nicole.gasiorowski@pacelabs.com  
Project Manager

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc.  
Martha Smith, Golder Associates Inc.  
Mike Williams, Golder Associates Inc



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: Bremo Monthly Process

Pace Project No.: 92310435

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### Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174  
Alabama Certification #: 41320  
Connecticut Certification #: PH-0216  
Delaware Certification: FL NELAC Reciprocity  
Florida Certification #: E83079  
Georgia Certification #: 955  
Guam Certification: FL NELAC Reciprocity  
Hawaii Certification: FL NELAC Reciprocity  
Illinois Certification #: 200068  
Indiana Certification: FL NELAC Reciprocity  
Kansas Certification #: E-10383  
Louisiana Certification #: FL NELAC Reciprocity  
Louisiana Environmental Certificate #: 05007  
Maryland Certification: #346  
Michigan Certification #: 9911  
Mississippi Certification: FL NELAC Reciprocity  
Missouri Certification #: 236  
Montana Certification #: Cert 0074

Nebraska Certification: NE-OS-28-14  
Nevada Certification: FL NELAC Reciprocity  
New York Certification #: 11608  
North Carolina Environmental Certificate #: 667  
North Carolina Certification #: 12710  
North Dakota Certification #: R-216  
Oklahoma Certification #: D9947  
Pennsylvania Certification #: 68-00547  
Puerto Rico Certification #: FL01264  
South Carolina Certification: #96042001  
Tennessee Certification #: TN02974  
Texas Certification: FL NELAC Reciprocity  
US Virgin Islands Certification: FL NELAC Reciprocity  
Virginia Environmental Certification #: 460165  
Wyoming Certification: FL NELAC Reciprocity  
West Virginia Certification #: 9962C  
Wisconsin Certification #: 399079670  
Wyoming (EPA Region 8): FL NELAC Reciprocity

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### Eden Certification IDs

205 East Meadow Road Suite A, Eden, NC 27288  
North Carolina Drinking Water Certification #: 37738

North Carolina Wastewater Certification #: 633  
Virginia/VELAP Certification #: 460025

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## SAMPLE ANALYTE COUNT

Project: Bremo Monthly Process

Pace Project No.: 92310435

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92310435001	T1-160828-1657-S3	ASTM D4282-02	KCE	1	PASI-E
		EPA 200.7	RVK	8	PASI-O

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## PROJECT NARRATIVE

Project: Bremo Monthly Process

Pace Project No.: 92310435

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**Method:** ASTM D4282-02

**Description:** Cyanide, Free

**Client:** Golder\_Dominion\_Bremo

**Date:** August 30, 2016

### General Information:

1 sample was analyzed for ASTM D4282-02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: Bremo Monthly Process

Pace Project No.: 92310435

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**Method:** EPA 200.7

**Description:** 200.7 MET ICP

**Client:** Golder\_Dominion\_Bremo

**Date:** August 30, 2016

**General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Bremo Monthly Process

Pace Project No.: 92310435

Sample: T1-160828-1657-S3		Lab ID: 92310435001		Collected: 08/28/16 16:57		Received: 08/29/16 13:45		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
Cyanide, Free	Analytical Method: ASTM D4282-02								
Cyanide, Free	ND	mg/L	0.050	1		08/30/16 10:15	57-12-5		
200.7 MET ICP	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	137	ug/L	100	1	08/30/16 13:12	08/30/16 17:28	7429-90-5		
Barium	252	ug/L	10.0	1	08/30/16 13:12	08/30/16 17:28	7440-39-3		
Beryllium	ND	ug/L	1.0	1	08/30/16 13:12	08/30/16 17:28	7440-41-7		
Boron	2110	ug/L	50.0	1	08/30/16 13:12	08/30/16 17:28	7440-42-8		
Cobalt	ND	ug/L	10.0	1	08/30/16 13:12	08/30/16 17:28	7440-48-4		
Iron	ND	ug/L	250	1	08/30/16 13:12	08/30/16 17:28	7439-89-6		
Molybdenum	174	ug/L	10.0	1	08/30/16 13:12	08/30/16 17:28	7439-98-7		
Vanadium	ND	ug/L	10.0	1	08/30/16 13:12	08/30/16 17:28	7440-62-2		

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Bremo Monthly Process

Pace Project No.: 92310435

QC Batch:	326849	Analysis Method:	ASTM D4282-02
QC Batch Method:	ASTM D4282-02	Analysis Description:	ASTM D4282 Free Cyanide
Associated Lab Samples:	92310435001		

METHOD BLANK: 1810696 Matrix: Water

Associated Lab Samples: 92310435001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide, Free	mg/L	ND	0.050	08/30/16 10:15	

LABORATORY CONTROL SAMPLE: 1810697

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide, Free	mg/L	.1	0.11	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1810698 1810699

Parameter	Units	92310435001		MS		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Cyanide, Free	mg/L	ND	.1	.1	.1	0.11	0.11	107	107	90-110	0			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Bremo Monthly Process  
Pace Project No.: 92310435

QC Batch:	318059	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 MET
Associated Lab Samples:	92310435001		

METHOD BLANK: 1689494 Matrix: Water  
Associated Lab Samples: 92310435001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	08/30/16 16:39	
Barium	ug/L	ND	10.0	08/30/16 16:39	
Beryllium	ug/L	ND	1.0	08/30/16 16:39	
Boron	ug/L	ND	50.0	08/30/16 16:39	
Cobalt	ug/L	ND	10.0	08/30/16 16:39	
Iron	ug/L	ND	250	08/30/16 16:39	
Molybdenum	ug/L	ND	10.0	08/30/16 16:39	
Vanadium	ug/L	ND	10.0	08/30/16 16:39	

LABORATORY CONTROL SAMPLE: 1689495

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	5000	5340	107	85-115	
Barium	ug/L	500	487	97	85-115	
Beryllium	ug/L	50	52.8	106	85-115	
Boron	ug/L	2500	2690	107	85-115	
Cobalt	ug/L	500	499	100	85-115	
Iron	ug/L	2000	1980	99	85-115	
Molybdenum	ug/L	500	479	96	85-115	
Vanadium	ug/L	500	556	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1689496 1689497

Parameter	Units	92310440001		MS		MSD		MS		MSD		% Rec		RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	% Rec	Limit		
Aluminum	ug/L	ND	5000	5000	5330	5380	106	107	70-130	1					
Barium	ug/L	148	500	500	639	640	98	98	70-130	0					
Beryllium	ug/L	ND	50	50	52.4	52.6	105	105	70-130	0					
Boron	ug/L	2140	2500	2500	4790	4800	106	107	70-130	0					
Cobalt	ug/L	ND	500	500	491	495	98	99	70-130	1					
Iron	ug/L	ND	2000	2000	1980	2000	98	99	70-130	1					
Molybdenum	ug/L	163	500	500	642	646	96	97	70-130	1					
Vanadium	ug/L	ND	500	500	551	557	109	110	70-130	1					

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## QUALIFIERS

Project: Bremo Monthly Process

Pace Project No.: 92310435

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether, Styrene, and Vinyl chloride.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-E Pace Analytical Services - Eden

PASI-O Pace Analytical Services - Ormond Beach

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: Bremo Monthly Process

Pace Project No.: 92310435

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92310435001	T1-160828-1657-S3	ASTM D4282-02	326849		
92310435001	T1-160828-1657-S3	EPA 200.7	318059	EPA 200.7	318112

## REPORT OF LABORATORY ANALYSIS

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	Document Name: <b>Sample Condition Upon Receipt(SCUR)</b>	Document Revised: May 24, 2016 Page 1 of 2
	Document No.: <b>F-MEC-CS-009-Rev.03</b>	Issuing Authority: Pace Mechanicsville Quality Office

Page 2 of 2 for Internal Use ONLY

**Sample Condition Upon Receipt**

Client Name:

Golder/Bremo

Project #:

1
**WO# : 92310435**

Courier:  
☐ Commercial

☐ Fed Ex  
☒ Pace

☐ UPS

☐ USPS

☐ Client

☐ Other:

Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other:

Thermometer:

☒ RMD001

☐

Type of Ice:

☒ Wet

☐ Blue

☐ None

☐ Samples on ice, cooling process has begun

Correction Factor: 0.0°C

Cooler Temp Corrected (°C):

Temp should be above freezing to 6°C

USDA Regulated Soil ( ☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

Comments/Discrepancy:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.
Rush Turn Around Time Requested?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.
Samples Field Filtered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	8. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Includes Date/Time/ID/Analysis Matrix: <u>WW</u>		
All containers needing acid/base preservation have been checked?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10. HNC3 pH<2
All containers needing preservation are found to be in compliance with EPA recommendation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	HCl pH<2
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	H <sub>2</sub> SO <sub>4</sub> pH<2
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	NaOH pH>12
		NaOH/ZnOAc pH>9
Samples checked for dechlorination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12.
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted:

Date/Time:

Comments/Sample

Discrepancy:

Project Manager SCURF Review:

NMG

Date:

8/30/16

Project Manager SRF Review:

NMG

Date:

8/30/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

